

REMARKS

In an Office Action mailed September 6, 2000, Claims 1-187 were rejected under 37 C.F.R. § 1.75(b) and M.P.E.P. 2173.05(n) as being unduly multiplied. Applicant was required to limit the total claims of this application to 125 with 25 being independent. Without acceding to the basis of the multiplicity rejection, Applicant filed an Amendment on October 6, 2000 reducing the total number of claims and reducing the number of independent claims. This application now contains Claims 1-39, 41-43, 45, 48-55, 68-70, 72-74, 76, 79-84, 96-99, 101-103, 105, 108-115, 128-149, 156-163, 168-171, and 179-187, which are presented for examination. See the status information on page 13 of the Amendment of May 22, 2000.

The Commissioner is hereby authorized to charge to Deposit Account No. 22-0585 any fees under 37 C.F.R. §§ 1.16 and 1.17 that may be required by this paper and to credit any overpayment to that Account. If any extension of time is required in connection with the filing of this paper and

has not been requested separately, such extension is hereby requested.

Respectfully submitted,

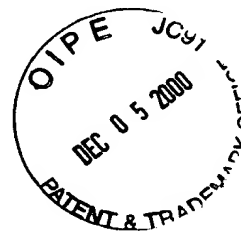
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Appendix



1 35. (Amended) A scanning exposure apparatus for
2 projecting a pattern image of a mask onto a sensitive plate
3 through a projection system having a predetermined
4 magnification ratio in a scanning manner, the apparatus
5 comprising:

6 (a) a scanning system [, kinetically connected to the
7 mask and the plate,] which has a first driving system to
8 move the mask and a second driving system to move the plate
9 and which synchronously scans the mask and the plate with
10 respect to a projection field of said projection system at a
11 velocity ratio corresponding to said magnification ratio
12 during a scanning exposure;

13 (b) a finely movable stage, [kinetically] connected to
14 said scanning system, which [finely] moves the mask relative
15 to said scanning system;

16 (c) a detector which detects a positional deviation
17 amount between the mask and the plate during the scanning
18 exposure; and

19 (d) a control system, connected to said finely movable
20 stage and said detector, which drives said finely movable
21 stage based on said detected deviation amount during the
22 scanning exposure.

1 36. (Twice amended) A scanning exposure method in
2 which a pattern of a mask is transferred onto a sensitive

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3 plate through a projection system in a scanning manner, the
4 method comprising [the steps of]:

5 (a) irradiating the mask with a radiation in order to
6 project an image of said pattern of the mask onto the plate
7 through said projection system;

8 (b) synchronously scanning each of the mask and the
9 plate relative to said projection system by using a scanning
10 mechanism for a scanning exposure wherein a scanning
11 velocity of the mask is different from a scanning velocity
12 of the plate;

13 (c) detecting a positional deviation amount between
14 the mask and the plate at a term of the scanning exposure by
15 using a first interferometer to measure positional
16 information of the mask and a second interferometer to
17 measure positional information of the plate; and

18 (d) correcting a position of the mask determined by
19 said scanning mechanism for decreasing said detected
20 deviation at the term of the scanning exposure.

1 37. (Amended) A scanning exposure apparatus in which
2 a first object is moved in a first direction and a second
3 object is moved in a second direction for a scanning
4 exposure, the apparatus comprising:

5 a projection system for the scanning exposure, which is
6 disposed in [between the first object and the second object]
7 an optical path of an exposure beam, the first object being
8 provided on one side of the projection system and the second

9 object being provided on the other side of the projection
10 system;

11 a first driving system which moves the first object in
12 the first direction, at least a part of the first driving
13 system being on the one side of the projection system;

14 a second driving system which [finely] moves the first
15 object in a plane substantially parallel to the surface of
16 the first object while the first object is moved by the
17 first driving system, at least a part of the second driving
18 system being on the one side of the projection system; and

19 a third driving system which moves the second object in
20 the second direction, at least a part of the third driving
21 system being on the other side of the projection system.

1 39. (Amended) An apparatus according to claim [37]
2 38, wherein said second driving system rotates said first
3 object.

1 42. (Amended) An apparatus according to claim [37]
2 41, wherein said third driving system includes a linear
3 motor.

1 48. (Amended) An apparatus according to claim 37,
2 further comprising:

3 a first [supporting] movable member which is movable in
4 the first direction; and

5 a second [supporting] movable member which is movable
6 relative to the first [supporting] movable member and which
7 supports the first object,

8 wherein the first object is moved in the first
9 direction by moving the first [supporting] movable member
10 with the first driving system, and the first object is
11 [finely] moved by moving the second [supporting] movable
12 member with the second driving system, relative to the first
13 [supporting] movable member.

1 49. (Amended) An apparatus according to claim 48,
2 wherein at least a part of said second driving system is
3 provided [at] on said first [supporting] movable member.

1 50. (Amended) An apparatus according to claim 48,
2 further comprising:
3 a reflective surface disposed on the second
4 [supporting] movable member; and
5 an interferometer, optically connected to the
6 reflective surface, which is used for detecting positional
7 information of the first object.

1 51. (Amended) An apparatus according to claim 48,
2 wherein the second driving system [finely] moves the second
3 [supporting] movable member without a weight of the first
4 [supporting] movable member.

1 52. (Amended) An apparatus according to claim 37,
2 wherein [an] the exposure beam irradiated onto said first
3 object defines a rectangular illumination area on said first
4 object, said first direction and said second direction are
5 parallel and reverse to one another, said projection system
6 has a reduction magnification, and a scanning speed of said
7 first object is different from a scanning speed of said
8 second object.

1 54. (Amended) An apparatus according to claim 38,
2 wherein said second driving system moves [said first object
3 finely] said mask before the pattern area of said mask
4 begins to be illuminated with [an] the exposure beam.

1 68. (Amended) A scanning exposure method in which a
2 first object is moved in a first direction and a second
3 object is moved in a second direction for a scanning
4 exposure, the method comprising:
5 moving a first object in the first direction by using a
6 first driving system;
7 [finely] shifting the first object in a plane
8 substantially parallel to a surface of the first object by
9 using a second driving system while the first object is
10 moved by the first driving system; and
11 moving a second object in the second direction by using
12 a third driving system.

1 70. (Amended) A method according to claim [68] 69,
2 wherein said second driving system rotates said first
3 object.

1 73. (Amended) A method according to claim [68] 72,
2 wherein said third driving system includes a linear motor.

1 79. (Amended) A method according to claim 68, wherein
2 the first driving system moves a first [supporting] movable
3 member in the first direction; and
4 the second driving system [finely] shifts a second
5 [supporting] movable member, which supports the first
6 object, relative to the first [supporting] movable member,
7 wherein the first object is moved in the first
8 direction by moving the first [supporting] movable member
9 with the first driving system and is [finely] shifted by
10 moving the second [supporting] movable member with the
11 second driving system.

1 80. (Amended) A method according to claim 79, wherein
2 at least a part of said second driving system is provided
3 [at] on said first [supporting] movable member.

1 81. (Amended) A method according to claim 79, wherein
2 the second driving system [finely] shifts the [second
3 supporting member] first object without a weight of the
4 first [supporting] movable member.

1 82. (Amended) A method according to claim 68, wherein
2 an exposure beam irradiated onto said first object defines a
3 rectangular illumination area on said first object, said
4 first direction and said second direction are parallel and
5 reverse to one another, a projection system for the scanning
6 exposure has a reduction magnification, and a scanning speed
7 of said first object is different from a scanning speed of
8 said second object.

1 83. (Amended) A method according to claim 69, wherein
2 said second driving system shifts [said first object finely]
3 said mask before the pattern area of said mask begins to be
4 illuminated with an exposure beam.

1 96. (Twice Amended) A method of manufacturing a
2 circuitry element [produced] with use of the method as
3 defined in claim 68.

1 97. (Amended) A method for making a scanning exposure
2 apparatus in which a first object is moved in a first
3 direction and a second object is moved in a second direction
4 for a scanning exposure, the method comprising:

5 providing a projection system for the scanning
6 exposure, which is disposed [between the first object and
7 the second object] in an optical path of an exposure beam,
8 the first object being provided on one side of the

9 projection system and the second object being provided on
10 the other side of the projection system;

11 providing a first driving system which moves the first
12 object in the first direction, at least a part of the first
13 driving system being on one side of the projection system;

14 providing a second driving system which [finely] moves
15 the first object in a plane substantially parallel to a
16 surface of the first object while the first object is moved
17 by the first driving system, at least a part of the second
18 driving system being on the one side of the projection
19 system; and

20 providing a third driving system which moves the second
21 object in the second direction, at least a part of the third
22 driving system being on the other side of the projection
23 system.

1 99. (Amended) A method according to claim [97] 98,
2 wherein said second driving system rotates said first
3 object.

1 102. (Amended) A method according to claim [97] 101,
2 wherein said third driving system includes a linear motor.

1 108. (Amended) A method according to claim 97,
2 further comprising:

3 providing a first [supporting] movable member which is
4 movable in the first direction; and

5 providing a second [supporting] movable member which is
6 movable relative to the first [supporting] movable member
7 and which supports the first object,
8 wherein the first object is moved in the first
9 direction by moving the first [supporting] movable member
10 with the first driving system and is [finely] moved relative
11 to the first [supporting] movable member by moving the
12 second [supporting] movable member with the second driving
13 system.

1 109. (Amended) A method according to claim 108,
2 wherein at least a part of said second driving system is
3 provided [at] on said first [supporting] movable member.

1 110. (Amended) A method according to claim 108,
2 further comprising:
3 providing a reflective surface disposed on the second
4 [supporting] movable member; and
5 providing an interferometer, optically connected to the
6 reflective surface, which is used for detecting positional
7 information of the first object.

1 111. (Amended) A method according to claim 108,
2 wherein the second driving system [finely] moves the second
3 [supporting] movable member without a weight of the first
4 [supporting] movable member.

1 112. (Amended) A method according to claim 97,
2 wherein [an] the exposure beam irradiated onto said first
3 object defines a rectangular illumination area on said first
4 object, said first direction and said second direction are
5 parallel and reverse to one another, said projection system
6 has a reduction magnification, and a scanning speed of said
7 first object is different from a scanning speed of said
8 second object.

1 114. (Amended) A method according to claim 98,
2 wherein said second driving system moves [said first object
3 finely] said mask before the pattern area of said mask
4 begins to be illuminated with [an] the exposure beam.

1 128. (Twice amended) A method of manufacturing a
2 circuitry element [produced by a] with use of a scanning
3 exposure apparatus made by the method as defined in claim
4 97.

1 129. (Amended) An apparatus according to claim 39,
2 wherein during movement of said [first object] mask by said
3 first driving system, said second driving system rotates
4 said [first object] mask about a rotation axis passing
5 through a predetermined point in an illumination region of
6 said exposure beam irradiated to said [first object] mask.

1 132. (Amended) An apparatus according to claim 37,
2 further comprising:
3 a fourth driving system which moves said second object
4 in a plane which is substantially parallel to a surface of
5 the second object and in a direction crossing said second
6 direction, at least a part of the fourth driving system
7 being disposed on the other side of the projection system.

1 133. (Amended) [An apparatus] A method according to
2 claim 70, wherein during movement of said [first object]
3 mask by said first driving system, said second driving
4 system rotates said [first object] mask about a rotation
5 axis passing through a predetermined point in an
6 illumination region of an exposure beam irradiated to said
7 [first object] mask.

1 135. (Amended) A method according to claim 68,
2 wherein during movement of said first object by said first
3 driving system at least a portion of said second driving
4 system moves in said first direction in order to [move]
5 shift said first object.

1 139. (Amended) A method according to claim 99,
2 wherein during movement of said [first object] mask by said
3 first driving system, said second driving system rotates
4 said [first object] mask about a rotation axis passing

5 through a predetermined point in an illumination region of
6 said exposure beam irradiated onto said [first object] mask.

1 140. (Amended) A method according to claim 97,
2 further comprising:

3 providing a fourth driving system which moves said
4 second object in a plane which is substantially parallel to
5 a surface of the second object and in a direction which
6 crosses said second direction, at least a part of the fourth
7 driving system being disposed on the other side of the
8 projection system.

1 141. [An apparatus] A method according to claim [118,
2 wherein

3 said first measuring device includes a first
4 interferometer system, and

5 said second measuring device includes a second
6 interferometer system] 97, further comprising:

7 providing a first interferometer system which detects
8 positional information of the first object; and

9 providing a second interferometer system which detects
10 positional information of the second object.

11 142. (Amended) [An apparatus] A method according to
12 claim [140] 141, wherein

13 said first interferometer system, has a measuring axis
14 for measuring the position of said first object in said

15 first direction, a measuring axis for measuring the position
16 of said first object in a direction which crosses said first
17 direction and a measuring axis for measuring information on
18 rotation of said first object, and

19 said second interferometer system has a measuring axis
20 for measuring the position of said second object in said
21 second direction, a measuring axis for measuring the
22 position of said second object in a direction which crosses
23 said second direction and a measuring axis for measuring
24 information on rotation of said second object.

1 179. (Amended) A scanning type exposure apparatus in
2 which in synchronism with moving a first object in a
3 predetermined direction relative to an exposure beam, a
4 second object is moved, thereby exposing sequentially each
5 of a plurality of defined regions on said second object,
6 comprising:

7 a projection system which is disposed in an optical
8 path of an exposure beam, said first object being provided
9 on an object side of the projection system;

10 a movable body which holds said first object and is
11 movable in said predetermined direction, at least a part of
12 the movable body being disposed on the object side of the
13 projection system; and

14 a first interferometer system optically connected to
15 said movable body, which has a measurement axis passing
16 through a substantial center of an irradiation region of

17 said exposure beam and which measures positional information
18 of said movable body relating to a direction intersecting
19 with said predetermined direction.

1 180. (Amended) An apparatus according to Claim 179,
2 further comprising:

3 a second interferometer system, optically connected
4 [for measuring] to said movable body, which measures
5 positional information of said movable body relating to said
6 predetermined direction.

1 183. (Amended) A scanning type exposure apparatus in
2 which in synchronism with moving a first object in a
3 predetermined direction relative to an exposure beam, a
4 second object is moved, thereby exposing sequentially each
5 of a plurality of defined regions on said second object,
6 comprising:

7 a projection system which is disposed in an optical
8 path of an exposure beam, said first object being provided
9 on an object side of the projection system;

10 a movable body which holds said first object, at least
11 a part of the movable body being disposed on the object side
12 of the projection system;

13 a first interferometer system, optically connected to
14 said movable body, which has a plurality of measurement axes
15 for detecting positional information of said movable body
16 relating to said predetermined direction; and

17 a plurality of reflection [surface] surfaces disposed
18 separately on said movable body in correspondence with said
19 plurality of the measurement axes.

1 184. (Amended) An apparatus according to Claim 183,
2 further comprising:

3 a second interferometer system, optically connected to
4 said movable body, which has a measurement axis and measures
5 [having a measurement axis for detecting] positional
6 information of said movable body with respect to a direction
7 intersecting with said predetermined direction; and

8 a reflection surface disposed on said movable body for
9 said second interferometer system and extended substantially
10 in parallel with said predetermined direction.

1 187. (Amended) A scanning type exposure apparatus in
2 which in synchronism with moving a first object in a first
3 direction, a second object is moved in a second direction,
4 thereby exposing sequentially each of a plurality of defined
5 regions on said second object, comprising:

6 a projection optical system which is disposed in an
7 optical path of an exposure beam, said first object being
8 provided on one side of the projection optical system, said
9 second object being provided on the other side of the
10 projection optical system, and an image of a pattern formed
11 on said first object being projected onto said second object
12 by the projection optical system;

13 a first movable stage [holding] which holds said first
14 object, at least a part of the first movable stage being
15 disposed on the one side of the projection optical system;

16 a second movable stage [holding] which holds said
17 second object, at least a part of the second movable stage
18 being disposed on the other side of the projection optical
19 system;

20 a first interferometer system [outputting] which
21 outputs positional information of said first movable stage,
22 the first interferometer system being optically connected to
23 said first movable stage;

24 a second interferometer system [outputting] which
25 outputs positional information of said second movable stage,
26 the second interferometer system being optically connected
27 to said second movable stage;

28 a first drive mechanism, functionally connected to the
29 first movable stage, which moves [for moving] said first
30 movable stage in said first direction;

31 a second drive mechanism, functionally connected to the
32 second stage, which moves [for moving] said second movable
33 stage in said second direction; and

34 [a projection optical system for projecting an image of
35 a pattern on said first object onto said second object; and]

36 a controller functionally connected to said first
37 interferometer system, said second interferometer system,
38 said first drive mechanism and said second drive mechanism,
39 which converts positional information in said second

40 direction of said second movable stage outputted from said
41 second interferometer system to first speed information and
42 speed controls said second drive mechanism so that said
43 first speed information may correspond to a constant speed
44 V , and which converts positional information in said first
45 direction of said first movable stage outputted from said
46 first interferometer system to second speed information and
47 speed controls said first drive mechanism so that [the last
48 mentioned] said second speed information may correspond to a
49 constant speed V/β , where β is a projection magnification of
50 the image of the pattern on said first object projected by
51 said projection optical system.